

0062369

VALIDATION REPORT

SAF NUMBER F03-006

SDG NUMBER H2307

 DRAFT

 X FINAL

RECEIVED
AUG 10 2004

EDMC

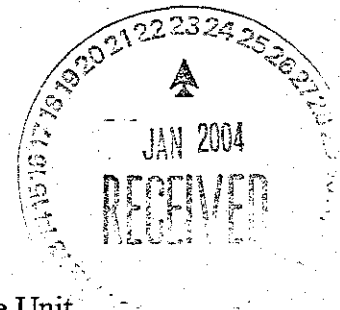
REVIEW COMMENT RECORD (RCR)				1. Date 1/9/2004		2. Review No.	
				3. Project No. 200-PW-2/4		4. Page 1 of 2	
5. Document Number(s)/Title(s) Data Validation for SDG H2307		6. Program/Project/Building Number Groundwater Protection Program		7. Reviewer SJ Trent		8. Organization/Group EIS	
						9. Location/Phone 373-5869	
17. Comment Submittal Approval		10. Agreement with indicated comment disposition(s) 11/29/04 Date		11. CLOSED 11/29/04 Date			
Organization Manager (optional)		Reviewer/Point of Contact Author/Originator		Reviewer/Point of Contact Author/Originator			
12. Item	13a. Comment(s)	13b. Basis	13c. Recommendation	14. Reviewer Concurrence Required	15. Disposition (Provide justification if NOT accepted)	16. Status	
1	General Chemistry Section: Holding time for Cr-VI is 30 days for soils, not 28 days. Note that validation procedure is also incorrect w/ respect to Cr-VI holding time.		Change holding time to 30 days; review all other validated packages to ensure correct holding time is indicated	SJT	Accepted		
2	General Chemistry section: Oil and Grease analysis is indicated as method 9071A. This method is the extraction methodology used. Actual analytical methodology is EPA 413.1		Change analysis method for oil and grease to EPA 413.1	SJT	Accepted		
3	Reduced size of form 1s and other attached data package documentation is difficult to read and will not allow for reproduction beyond the copy provided for review		Issued data validation reports will have the original marked up form 1s and other supporting data package documentation included at full size. This applies to all other validation reports provided by EQM.	SJT	Accepted		

REVIEW COMMENT RECORD (RCR) (continued)				1. Date 1/9/2004	2. Review No.	
				3. Project No. 200-PW-2/4	4. Page 2 of 2	
12. Item	13a. Comment(s)	13b. Basis	13c. Recommendation	14. Reviewer Concurrence Required	15. Disposition (Provide justification if NOT accepted)	16. Status
4	Various degrees of consistency are present between different validation report sections. For example, rad chem section refers to "Data Package Number" throughout the report whereas general chemistry section refers to "SDG" when referencing the data package.		Ensure consistency of editorial style throughout the report. Check and correct other validation data packages for the same consistency issues.	<i>g2</i>	<i>Will address this comment on future validation reports.</i>	

[illegible]

[illegible]

Date: 11/18/03
To: Fluor Hanford
From: EQM, Inc.
Project: 200 Area Source Characterization 200-PW-2 & 4 Operable Unit
Subject: General Chemistry Analysis, Method -Data Package SDG H2307



INTRODUCTION

This memo presents the results of Data Validation on Data Package SDG H2307 prepared by Lionville Laboratory, Inc. (LLI) for General Chemistry analysis. A list of samples validated along with the analysis reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis & Method #
B173W0	7/31/03	Soil	C	CR ⁺⁶ 3060A/7196A, pH- 9045C, O&G 9071A/413.1, Solids-ASTMD2216-80 NO ₂ NO ₃ .EPA 353.2 (mod)
B173W1	7/31/03	Soil	C	CR ⁺⁶ 3060A/7196A, pH- 9045C, G&O 9071A/413.1, Solids-ASTMD2216-80 NO ₂ NO ₃ .EPA 353.2 (mod)
B173W2	8/04/03	Soil	C	CR ⁺⁶ 3060A/7196A, pH- 9045C, O&G 9071A/413.1, Solids-ASTMD2216-80 NO ₂ NO ₃ .EPA 353.2 (mod)

Data validation was conducted in accordance with the BHI Validation Procedure for Chemical Analysis BHI-01435 and Sampling and Analysis Plan, DOE/RL-2000-60, Rev. 1, Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualifiers
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain of Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Documentation Requested by the Client- not applicable

DATA QUALITY OBJECTIVES

- **Holding Times**

Analytical holding time requirements are 30 days for chromium (VI), 28 days for oil and grease, and 24 hours for pH.

All holding times were met.

- **Method Blanks**

At least one method blank per analytical batch of samples was analyzed. It consisted of deionized distilled water was processed through each set of the sample preparation and analysis procedures.

All method blanks fell within acceptable limits.

- **Field Blanks**

No field blanks were submitted for analysis.

- **Accuracy**

Matrix spike analyses were used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spikes must be analyzed at least one per analytical batch and must be taken through the same procedures and added as early in the sample preparation process as possible. Matrix spike recoveries must fall within the range of 75 to 125%. If the sample concentration exceeds the spike concentration by a factor of 4 or more, no qualification is required.

Matrix spikes were analyzed where applicable (i.e. no matrix spike can be analyzed for pH) and met acceptance criteria

- **Laboratory Control Sample (LCS) or Blank Spike Sample (BBS)**

LCSs /BSS are also used to measure accuracy. They are analyzed at a frequency of one per analytical batch. The acceptable limits for the LCS/ BSS are 80-120%

All LCS/BSS met the acceptance criteria except the O&G which has a 76% recovery which is outside the laboratory limit of 80-120%. Based on the validation criteria all samples are nondetects and thus flagged UJ.

- **Precision**

Duplicate Samples

Laboratory duplicate samples are used to measure laboratory precision and sample homogeneity. They were analyzed at a frequency of one per batch. Duplicate samples were prepared at the same time, using the same procedures as their associated samples. Results must be within a relative percent difference (RPD) of $\leq 20\%$ for non-aqueous samples.

All duplicate results met these criteria.

Field Duplicate Samples

Sample B173W1 is a duplicate of sample B173W0. All sample-to-sample RPDs met acceptance criteria.

- **Analytical Detection Limits**

Reported analytical detection limits were compared against the requirements of the Sampling & Analysis Plan, DOE/RL-2000-60, Rev 1.

All required detection limits were met except for the oil and grease which is measured as 667 mg/kg in the method blank and ranged from 685 to 692 mg/kg in the samples. All the reporting limits are above the SAP requirement of 200mg/kg. Samples are reported as non-detects. Per section 9.7 of the BHI validation procedure no flags were added.

- **Completeness**

The data package for SDG H2307 was submitted for validation and verified for completeness. Completeness was based on the number of data determined to be valid.

The completeness percentage was 100%

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

See discussion of the LCS.

REFERENCES

BHI-01435. Rev 0, Validation Procedure for Chemical Analysis

DOE-RL2000-60, Rev. 1 (redline version 4/23/03), Uranium-Rich/General Process Condensate and Process Waste Group Operable Units RI/FS Work Plan and RCRA TSD Unit Sample Plan-Includes 200-PW-2 and 200-PW-4 Operable Units.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with BHI-01435 and DOE/RL-2000-60.

U - Indicates the compound or analysis was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data was usable for decision making purposes.

J - Indicates the compound or analyte was analyzed and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data was usable for the decision making purposes.

BJ - Applied to inorganic analyses only. Indicates that the analyte concentration is Greater than the IDL but less than the CRDL and is considered an estimate.

R - Indicates the compound or analyte was analyzed for, detected and due to identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to a major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e. usable for decision making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e. usable for decision making purposes).

Appendix 2
Summary of Data Qualifiers

DATA QUALIFICATION SUMMARY

SDG: H2307	REVIEWER: MAH/MSM	DATE: 11/12/03, 11/22/03	PAGE 1 OF 1
COMMENTS:			
SAMPLES AFFECTED	QUALIFIER	COMPOUND	REASON
B173W0 B173W1 B173W2	UJ	Oil and Grease	LCS

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation



Analytical Report

Client: TNU-HANFORD F03-006 H2307

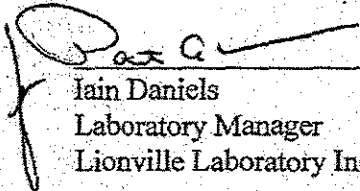
LVL#: 0308L133

W.O.#: 11343-606-001-9999-00

Date Received: 08-08-03

INORGANIC NARRATIVE

1. This narrative covers the analyses of 3 soil samples.
2. The samples were prepared and analyzed in accordance with the methods indicated on the attached glossary.
3. Sample holding times as required by the method and/or contract were met.
4. The results presented in this report are derived from samples that met LVL's sample acceptance policy.
5. The method blanks were within the method criteria.
6. The Laboratory Control Samples (LCS) were within the laboratory control limits with the exception of 03LOG037-MB1 for Oil and Grease that was below the control limits of 80-120% at 76.2% (the associated matrix spike recovery for Oil and Grease was at 102.0%).
7. The matrix spike recoveries for Nitrate Nitrite, Oil and Grease and Chromium VI were within the 75-125% control limits.
8. The replicate analyses for Nitrate Nitrite, Oil and Grease, Percent Solids and Chromium VI were within the 20% Relative Percent Difference (RPD) control limit.
9. Results for solid samples are reported on a dry weight basis.
10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.


Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

njpl08-133

The results presented in this report relate to the analytical testing and conditions of the samples upon receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 15 pages.

09-08-03
Date

03

03084133

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

[illegible]

FH-Central Plateau Project		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-006-201		Page 1 of 1	
Collector Pope/Pfister/Hughes/Johansen		Company Contact LC Hulstrom		Telephone No. 373-3928		Project Coordinator TRENT, SJ		Price Code 8N Data Turnaround 45 Days	
Project Designation 200-PW-2/200-PW-4 OU - Borehole Soil Sampling		Sampling Location 7-16-03 (24160) 216-A-36B (G3248) - 53.5-56'		SAF No. F03-006		Air Quality <input type="checkbox"/>			
Ice Chest No. SAWS 002		Field Logbook No. HNP-N-3361		COA 117504ES10		Method of Shipment Federal Express			
Shipped To MS 7-1-03 EDERLINE SERVICES (Formerly TMA) Beera		Offsite Property No. A030337		Bill of Lading/Air Bill No. SEE 037C					
POSSIBLE SAMPLE HAZARDS/REMARKS RADIOACTIVE TIE TO: B173V3, B173V4, B17495 MS 8-2-03 Special Handling and/or Storage				Preservation	Cool 4C	None	None	None	
				Type of Container	aG	aG	aG	aG	
				No. of Container(s)	1	1	1	1	
				Volume	60mL	60mL	60mL	60mL	
				SAMPLE ANALYSIS				NO2/NO3 - 353.2; Oil & Grease - 413.1; Chromium Hex - 7196	Soil (1) in Special Instructions
Sample No.	Matrix *	Sample Date	Sample Time						
B173W0	SOIL	7-31-03	0730	X					
B173W1	SOIL	7-31-03	0730	X					
CHAIN OF POSSESSION				Sign/Print Names		SPECIAL INSTRUCTIONS			
Relinquished By/Removed From R. PALSTER 7/31/03 1030		Date/Time		Received By/Stored In SITE FRIG. 7/31/03 1030		Date/Time		The lab is to analyze within a time limit of 30 days for G-14. FFI acknowledges that holding times (less than 14 days) may not be met by the lab due to the radi characteristics. (1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Cesium-134, Radium-226, Radium-228, Th-232); Total Uranium, Americium-241, Isotopic Plutonium, Isotopic Uranium (2) Technetium-99, Strontium-90, Total Pb, Isotopic Thorium (Thorium-232); Carbon-14, Iodine-129, Nickel-63, Neptunium-237 7-31-03	
Relinquished By/Removed From SITE FRIG. 8-4-03 1320		Date/Time		Received By/Stored In P. S. A. 8-4-03 1320		Date/Time			
Relinquished By/Removed From SSP/PA/STW 8-4-03 1510		Date/Time		Received By/Stored In SITE FRIG. #2 8-4-03 1510		Date/Time			
Relinquished By/Removed From SITE FRIG. #2 8/7/03 0830		Date/Time		Received By/Stored In M. J. 8/7/03 0830		Date/Time			
Relinquished By/Removed From M. J. 8/7/03 0900		Date/Time		Received By/Stored In F. J. 8/7/03 0900		Date/Time			
Relinquished By/Removed From K. S. 8/7/03 0930		Date/Time		Received By/Stored In K. S. 8/7/03 0930		Date/Time		Matrix *	
LABORATORY SECTION		Received By		Title		Date/Time		6-Soil SE-Sediment SO-Solid SL-Sludge W-Water O-Oil A-Air DS-Dry Solid OL-Oil Liquid TL-Tissue WL-Water L-Liquid V-Vaporization X-Other	
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time			

Temp 5.7

Appendix 5

Data Validation Supporting Documentation

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

VALIDATION LEVEL:	A	B	C	D	E																		
PROJECT:	200 PW-2944																						
VALIDATOR:	MSM																						
CASE:	SDG:																						
ANALYSES PERFORMED	<table border="1"> <tr> <td>Ammonia/IC</td> <td>TOC</td> <td>TOX</td> <td>TPH-418.1</td> <td>Oil and Grease</td> <td>Alkalinity</td> </tr> <tr> <td>Ammonia</td> <td>BOD/COD</td> <td>Chloride</td> <td>Chromium-VI</td> <td>pH</td> <td>NO₃/NO₂</td> </tr> <tr> <td>Sulfate</td> <td>TDS</td> <td>TKN</td> <td>Phosphate</td> <td>20561.6</td> <td></td> </tr> </table>					Ammonia/IC	TOC	TOX	TPH-418.1	Oil and Grease	Alkalinity	Ammonia	BOD/COD	Chloride	Chromium-VI	pH	NO ₃ /NO ₂	Sulfate	TDS	TKN	Phosphate	20561.6	
Ammonia/IC	TOC	TOX	TPH-418.1	Oil and Grease	Alkalinity																		
Ammonia	BOD/COD	Chloride	Chromium-VI	pH	NO ₃ /NO ₂																		
Sulfate	TDS	TKN	Phosphate	20561.6																			
SAMPLES/MATRIX																							
SCL																							

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ☒ Yes ☐ No ☐ N/A

Comments:

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations performed on all instruments? ☐ Yes ☐ No ☒ N/A

Initial calibrations acceptable? ☐ Yes ☐ No ☒ N/A

ICV and CCV checks performed on all instruments? ☐ Yes ☐ No ☒ N/A

ICV and CCV checks acceptable? ☐ Yes ☐ No ☒ N/A

Standards traceable? ☐ Yes ☐ No ☒ N/A

Standards expired? ☐ Yes ☐ No ☒ N/A

Calculation check acceptable? ☐ Yes ☐ No ☒ N/A

Comments:

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

3. BLANKS (Levels B, C, D, and E)

ICB and CCB checks performed for all applicable analyses? (Levels D, E) Yes No N/A
 ICB and CCB results acceptable? (Levels D, E) Yes No N/A
 Laboratory blanks analyzed? Yes No N/A
 Laboratory blank results acceptable? Yes No N/A
 Field blanks analyzed? (Levels C, D, E) Yes No N/A
 Field blank results acceptable? (Levels C, D, E) Yes No N/A
 Transcription/calculation errors? (Levels D, E) Yes No N/A

Comments: _____

4. ACCURACY (Levels C, D, and E)

Spike samples analyzed? Yes No N/A
 Spike recoveries acceptable? Yes No N/A *OMM*
 Spike standards NIST traceable? (Levels D, E) Yes No N/A
 Spike standards expired? (Levels D, E) Yes No N/A
 LCS/BSS samples analyzed? Yes No N/A
 LCS/BSS results acceptable? Yes No N/A
 Standards traceable? (Levels D, E) Yes No N/A
 Standards expired? (Levels D, E) Yes No N/A
 Transcription/calculation errors? (Levels D, E) Yes No N/A
 Performance audit sample(s) analyzed? Yes No N/A
 Performance audit sample results acceptable? Yes No N/A

Comments: yes 50:Kes (ms) Acceptable.
LCS NOT Acceptable for ORO.
Other LCS OK.

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable? ☒ Yes No N/A

Duplicate results acceptable? ☒ Yes No N/A

MS/MSD standards NIST traceable? (Levels D, E) Yes No ☒ N/A

MS/MSD standards expired? (Levels D, E) Yes No ☒ N/A

Field duplicate RPD values acceptable? ☒ Yes No ☒ N/A

Field split RPD values acceptable? Yes No ☒ N/A

Transcription/calculation errors? (Levels D, E) Yes No ☒ N/A

Comments:

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6. HOLDING TIMES (all levels)

Samples properly preserved? ☒ Yes No N/A

Sample holding times acceptable? ☒ Yes No N/A

Comments:

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GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

7. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

Results reported for all requested analyses? ☒ Yes No N/A
Results supported in the raw data? (Levels D, E) Yes No ☒ N/A
Samples properly prepared? (Levels D, E) Yes No ☒ N/A
Detection limits meet RDL? Yes ☒ No N/A
Transcription/calculation errors? (Levels D, E) Yes No ☒ N/A

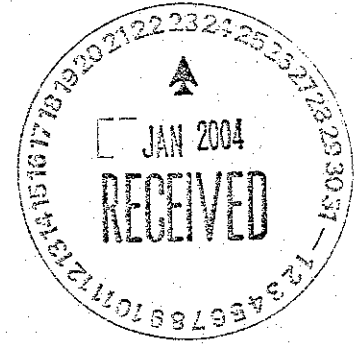
Comments:

NOT meet SAP RDL for 096. All other
Analytes OK.

GENERAL CHEMISTRY DATA VALIDATION CHECKLISTS

Comments (attach additional sheets as necessary):

Date: November 14, 2003
To: Fluor Hanford Inc.
From: EQM
Project: PW-2, 216-A-36B Borehole (C3248/C4160)
Subject: Radiochemistry-Data Package No. H2307



INTRODUCTION

This memo presents the results of data validation on Data Package No. H2307 prepared by Eberline Services. A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B173W0	07/31/03	Soil	C	See note 1
B173W1	07/31/03			
B173W2	08/04/03			

- 1- Gamma Spectroscopy, alpha spectroscopy (U-iso, Pu-iso, Th-iso), Am-241, Np-237, Total-U, Tc-99, Sr-89, 90 (Total), C-14, I-129, Ni-63, H-3.

Data validation was conducted in accordance with BHI validation procedure, *Data Validation Procedure for Radiochemical Analysis*, October 2000, BHI-01433, Rev. 0 and the *Uranium-Rich/General Process Condensate and Process Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan*, DOE/RL-2000-60, Rev. 1. Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Data Requested by Client- not applicable

DATA QUALITY PARAMETERS

- **Holding Times**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 6 months.

All holding times were acceptable.

- **Preparation (Method) Blanks**

Laboratory Blanks

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the minimum detectable activity (MDA), the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the MDA are qualified as undetected and flagged "U"; samples results above the MDA and greater than five times the highest blank concentration are not qualified.

For Eu-154, the blank results were reported as "U", but the reported MDA was greater than the RDL. In those cases, the MDA's were used in the data evaluation criteria for the blanks. Based on the evaluation, "J" qualifiers were applied for Eu-154.

Field Blank

No field blanks were submitted for analysis.

- **Accuracy**

Accuracy is evaluated from laboratory control sample (LCS) or blank spike sample (BSS) batch samples and spiked samples from the analytical batch. Measured activities are compared to the known added amounts. The acceptable LCS or BSS and matrix spike (MS) recovery range is 65-135%. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, or not qualified, depending on the activity of the individual sample. Results are rejected for LCS/BSS recoveries of less than 30%, tracer recoveries of less than 20%, and tracer recoveries of greater than 115% for detected results.

All LCS accuracy results were acceptable.

Due to the lack of a matrix spike analysis for C-14, and because no tracer or carrier was used on the C-14 analysis, all C-14 results were "J" flagged.

- Laboratory Duplicates

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If a duplicate sample was not analyzed, qualify all associated sample results as estimated (J, UJ). If the sample and duplicate concentration are both $>5 \times \text{RDL}$ and the RPD is $>20\%$ for water samples ($>35\%$ for soil samples), qualify all associated sample and duplicate results as estimated (J). If both sample and duplicate results are non-detect, no qualification is required. If either or both of the sample and duplicate sample concentrations are $<5 \times \text{RDL}$, the above RPD criteria do not apply and the range of the sample and duplicate concentrations must be evaluated as follows:

- If the range in concentration between the sample result(s) or quantitation limit(s) are $\leq \text{RDL}$ unit for water samples ($\leq 2 \times \text{RDL}$ units for soil samples), no qualification is required.
- If the range in concentration between the sample result of quantitation limit are $> \text{RDL}$ unit for water samples ($> 2 \times \text{RDL}$ units for soil samples), then qualify all associated sample results as estimated (J). Non-detects are not qualified.

All duplicate results were acceptable.

Field Duplicate

Samples B173W0 and B173W1 were field duplicates. The RPD's are calculated when both the sample results and the duplicate results are greater than 5X the analyte specific RDL. All calculated RPD's were acceptable. In addition, if either the sample or duplicate is less than 5X the analyte specific RDL, the range of the sample and duplicate concentrations must be evaluated. The ranges for Ra-226 and Ra-228 exceeded the criteria of 2X the RDL.

As per the data validation procedure, data qualifiers are not required for field duplicate RPD's. The information is provided to alert data users to uncertainties in the data set during decision making.

- Detection Levels

The reported MDA's exceeded the RDL's for Co-60, Ra-226, Ra-228, Eu-152, Eu-154 and Eu-155 for all of the samples. The reported MDA exceeded the RDL Cs-137 for sample B173W0. As per the data validation procedure, no qualifiers are required to be applied to the data.

- Completeness

Data package No.H2307 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

- Due to blank results exceeding the data validation criteria, "J" qualifiers were applied to Eu-154, for all samples.
- Due to the lack of a matrix spike analysis for C-14, and because no tracer or carrier was used on the C-14 analysis, all C-14 results were "J" flagged.

REFERENCES

Data Validation Procedure for Radiochemical Analysis, October 2000, BHI-01433, Rev. 0

Uranium-Rich/General Process Condensate and Process Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan, DOE/RL-2000-60, Rev. 1.

Appendix 1
Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI statement of work are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.
- UJ - Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimated, but the data are usable for decision-making purposes.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

Appendix 2

Summary of Data Qualification

★

DATA QUALIFICATION SUMMARY

SDG: H2307	REVIEWER: KAB	DATE: 11/14/03	PAGE 1 OF 1
COMMENTS:			
SAMPLES AFFECTED	QUALIFIER	COMPOUND	REASON
B173W0	J J	Eu-154 C-14	Blank No matrix spike
B173W1	J J	Eu-154 C-14	Blank No matrix spike
B173W2	J J	Eu-154 C-14	Blank No matrix spike

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

BERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H2307

7562-001

B173W0

DATA SHEET

SDG <u>7562</u>	Client/Case no <u>Hanford</u>	SDG <u>H2307</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R308042-01</u>	Client sample id <u>B173W0</u>	
Dept sample id <u>7562-001</u>	Location/Matrix <u>216-A-36B (C4160)</u>	<u>SOLID</u>
Received <u>08/08/03</u>	Collected/Weight <u>07/31/03 07:30</u>	<u>264.3 g</u>
% solids <u>95.8</u>	Custody/SAF No <u>F03-006-201</u>	<u>F03-006</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	10.0	0.36	0.24	400		H
Carbon 14	14762-75-5	0.108	1.6	2.7	50	UJ	C
Nickel 63	13981-37-8	-0.786	1.3	2.2	30	U	NI_L
Total Strontium	SR-RAD	102	2.2	0.38	1.0		SR
Technetium 99	14133-76-7	-0.042	0.23	0.56	15	U	TC
Thorium 228	14274-82-9	0.579	0.26	0.25			TH
Thorium 230	14269-63-7	0.418	0.26	0.25	1.0		TH
Thorium 232	TH-232	0.418	0.26	0.25	1.0		TH
Total Uranium (ug/g)	7440-61-1	2.52	0.29	0.007	1.0		U_T
Uranium 233/234	U-233/234	3.87	0.76	0.20	1.0		U
Uranium 235	15117-96-1	0.096	0.13	0.25	1.0	U	U
Uranium 238	U-238	1.56	0.46	0.20	1.0		U
Neptunium 237	13994-20-2	0.042	0.085	0.13	1.0	U	NP
Plutonium 238	13981-16-3	0.035	0.11	0.19	1.0	U	PU
Plutonium 239/240	PU-239/240	0.368	0.18	0.13	1.0		PU
Americium 241	14596-10-2	0.194	0.15	0.19	1.0		AM
Iodine 129	15046-84-1	-0.080	0.42	0.95	2.0	U	I
Potassium 40	13966-00-2	19.4	1.8	1.0			GAM
Cobalt 60	10198-40-0	0.280	0.11	0.11	0.050		GAM
Tin 126	15032-50-5	U		0.20		U	GAM
Cesium 134	13967-70-9	U		0.11		U	GAM
Cesium 137	10045-97-3	2.56	0.17	0.13	0.10		GAM
Radium 226	13982-63-3	0.743	0.19	0.18			GAM
Radium 228	15282-20-1	1.15	0.49	0.44			GAM
Europium 152	14683-23-9	U		0.23	0.10	U	GAM
Europium 154	15585-10-1	U		0.30	0.10	UJ	GAM
Europium 155	14391-16-3	U		0.27	0.10	U	GAM
Thorium 228	14274-82-9	0.796	0.098	0.10			GAM

200-PW-2/200-PW-4 CU-Borehole Soil

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Lab id BERLINE
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 09/19/03

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H2307

7562-001

B173W0

DATA SHEET, cont

SDG <u>7562</u>	Client/Case no <u>Hanford</u>	SDG <u>H2307</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R308042-01</u>	Client sample id <u>B173W0</u>	
Dept sample id <u>7562-001</u>	Location/Matrix <u>216-A-36B (C4160)</u>	<u>SOLID</u>
Received <u>08/08/03</u>	Collected/Weight <u>07/31/03 07:30</u>	<u>264.3 g</u>
* solids <u>95.8</u>	Custody/SAP No <u>F03-006-201</u>	<u>F03-006</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALY- FIBRS	TEST
Thorium 232	TH-232	1.15	0.49	0.44			GAM
Uranium 235	15117-96-1	U		0.50		U	GAM
Uranium 238	U-238	U		12		U	GAM
Americium 241	14596-10-2	U		0.33		U	GAM

200-PW-2/200-PW-4 OU-Borehole Soil

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Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.05</u>
Report date <u>09/19/03</u>

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H2307

7562-002

B173W1

DATA SHEET

SDG <u>7562</u>	Client/Case no <u>Hanford</u>	SDG <u>H2307</u>
Contact <u>Melissa C. Mannion</u>	Contract <u>No. 630</u>	
Lab sample id <u>R308042-02</u>	Client sample id <u>B173W1</u>	
Dept sample id <u>7562-002</u>	Location/Matrix <u>216-A-36B (C4160)</u>	<u>SOLID</u>
Received <u>08/08/03</u>	Collected/Weight <u>07/31/03 07:30</u>	<u>260.2 g</u>
% solids <u>96.1</u>	Custody/SAP No <u>P03-006-201</u>	<u>P03-006</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	12.4	0.40	0.25	400		H
Carbon 14	14762-75-5	0.247	1.7	2.8	50	UJ	C
Nickel 63	13981-37-8	-1.68	1.4	2.4	30	U	NI_L
Total Strontium	SR-RAD	87.4	2.0	0.37	1.0		SR
Technetium 99	14133-76-7	0.089	0.27	0.57	15	U	TC
Thorium 228	14274-82-9	0.293	0.20	0.25			TH
Thorium 230	14269-63-7	0.520	0.26	0.25	1.0		TH
Thorium 232	TH-232	0.813	0.33	0.25	1.0		TH
Total Uranium (ug/g)	7440-61-1	1.49	0.17	0.007	1.0		U_T
Uranium 233/234	U-233/234	2.31	0.54	0.21	1.0		U
Uranium 235	15117-96-1	0.097	0.13	0.25	1.0	U	U
Uranium 238	U-238	1.02	0.34	0.21	1.0		U
Neptunium 237	13994-20-2	0	0.092	0.14	1.0	U	NP
Plutonium 238	13981-16-3	0.052	0.052	0.20	1.0	U	PU
Plutonium 239/240	PU-239/240	0.414	0.21	0.20	1.0		PU
Americium 241	14596-10-2	0.051	0.10	0.20	1.0	U	AM
Iodine 129	15046-84-1	-0.051	0.36	0.82	2.0	U	I
Potassium 40	13966-00-2	16.1	6.2	0.89			GAM
Cobalt 60	10198-40-0	0.246	0.10	0.10	0.050		GAM
Tin 126	15832-50-5	U		0.11		U	GAM
Cesium 134	13967-70-9	U		0.10		U	GAM
Cesium 137	10045-97-3	2.55	0.12	0.090	0.10		GAM
Radium 226	13982-63-3	0.456	0.24	0.16			GAM
Radium 228	15262-20-1	0.544	0.44	0.32			GAM
Europium 152	14683-23-9	U		0.19	0.10	U	GAM
Europium 154	15585-10-1	U		0.26	0.10	UJ	GAM
Europium 155	14391-16-3	U		0.17	0.20	U	GAM
Thorium 228	14274-82-9	0.753	0.19	0.14			GAM

200-PW-2/200-PW-4 OU-Borehole Soil

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Version <u>Ver 1.0</u>
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Report date <u>09/19/03</u>

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H2307

7562-002

B173W1

DATA SHEET, cont

SDG <u>7562</u>	Client/Case no <u>Hanford</u>	SDG <u>H2307</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R308042-02</u>	Client sample id <u>B173W1</u>	
Dept sample id <u>7562-002</u>	Location/Matrix <u>216-A-36B (C4160)</u>	<u>SOLID</u>
Received <u>08/08/03</u>	Collected/Weight <u>07/31/03 07:30</u>	<u>260.2 g</u>
% solids <u>95.1</u>	Custody/SAF No <u>F03-006-201</u>	<u>F03-006</u>

ANALYTE	CAS NO	RESULT pCi/g	1σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALITY- FIERE	TEST
Thorium 232	TH-232	0.544	0.44	0.32			GAM
Uranium 235	15117-95-1	U		0.27		U	GAM
Uranium 238	U-238	U		9.6		U	GAM
Americium 241	14596-10-2	U		0.11		U	GAM

200-FW-2/200-FW-4 OU-Borehole Soil

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Version <u>3.06</u>
Report date <u>09/19/03</u>

BERLINE SERVICES/RICHMOND
SAMPLE DELIVERY GROUP H2307

7562-003

B173W2

DATA SHEET

SDC 7562 Contact <u>Melissa C. Mason</u>	Client/Case no <u>Hanford</u> Contract No. <u>530</u>	SDC H2307
Lab sample id <u>R108042-03</u> Dept sample id <u>7562-003</u> Received <u>08/08/03</u> % solids <u>97.2</u>	Client sample id <u>B173W2</u> Location/Matrix <u>215-A-36R [C4150]</u> <u>SOLID</u> Collected/Weight <u>08/04/03 11:25</u> <u>290.8 g</u> Custody/SAP No <u>F03-006-201</u> <u>F03-006</u>	

ANALYTE	CAS NO	RESULT pci/g	2σ HRP (COUNT)	MDA pci/g	SDL pci/g	QUALI- FIERS	TEST
Tritium	10828-17-8	21.0	0.53	0.27	400		K
Carbon 14	14763-75-5	0.104	1.6	2.8	50	U J	C
Nickel 63	13981-37-8	-2.05	1.3	2.4	30	U	NI_L
Total Strontium	SR-RAD	-0.005	0.14	0.32	1.0	U	SR
Technetium 99	14133-74-7	0.210	0.17	0.52	15	U	TC
Thorium 228	14274-82-9	0.822	0.34	0.25			TH
Thorium 230	14269-63-7	0.362	0.26	0.25	1.0		TH
Thorium 232	TH-232	0.953	0.34	0.25	1.0		TH
Total Uranium (ug/g)	7440-61-1	0.505	0.060	0.007	1.0		U_T
Uranium 233/234	U-233/234	0.846	0.30	0.22	1.0		U
Uranium 235	15117-96-1	0.034	0.068	0.26	1.0	Y	U
Uranium 238	U-238	0.705	0.29	0.22	1.0		U
Neptunium 237	13994-20-2	0	0.077	0.12	1.0	U	NP
Plutonium 238	13981-18-1	-0.027	0.054	0.21	1.0	U	PU
Plutonium 239/240	PU-239/240	0.027	0.054	0.21	1.0	U	PU
Americium 241	14396-10-2	0	0.040	0.15	1.0	U	AM
Iodine 129	15046-84-1	0.069	0.39	0.88	2.0	U	I
Potassium 40	13966-00-2	18.2	1.4	0.72			GAM
Cobalt 60	10198-40-0	U		0.088	0.050	U	GAM
Tin 126	15032-50-5	U		0.30		U	GAM
Cesium 134	13967-70-0	U		0.093		U	GAM
Cesium 137	10443-97-3	0.132	0.036	0.074	0.10		GAM
Radium 226	13983-63-3	0.636	0.15	0.16			GAM
Radium 228	15262-20-1	1.13	0.33	0.36			GAM
Europium 152	14683-23-9	U		0.16	0.10	U	GAM
Europium 154	15503-10-1	U		0.25	0.10	U J	GAM
Europium 155	14391-16-3	U		0.16	0.10	U	GAM
Thorium 228	14274-82-9	0.903	0.083	0.076			GAM

200-PW-2/200-PW-4 OU-Borehole Soil

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Lab id <u>BERLINE</u>
Protocol <u>Hanford</u>
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Version <u>1.06</u>
Report Date <u>09/19/03</u>

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H2307

7562-003

B173W2

DATA SHEET, cont

SDG <u>7562</u>	Client/Case no <u>Hanford</u>	SDG <u>H2307</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R308042-03</u>	Client sample id <u>B173W2</u>	
Dept sample id <u>7562-003</u>	Location/Matrix <u>216-A-36B (C4160)</u>	<u>SOLID</u>
Received <u>08/08/03</u>	Collected/Weight <u>08/04/03 11:25</u>	<u>290.8 g</u>
% solids <u>97.2</u>	Custody/SAP No <u>F03-006-201</u>	<u>F03-006</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Thorium 232	TH-232	1.13	0.35	0.36			GAM
Uranium 235	15117-96-1	U		0.23		U	GAM
Uranium 238	U-238	U		10		U	GAM
Americium 241	14596-10-2	U		0.18		U	GAM

200-PW-2/200-PW-4 OU-Borehole Soil

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Lab id <u>EBERLINE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
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Report date <u>09/19/03</u>

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

1.0 GENERAL

Fluor Hanford Inc. (FH) Sample Delivery Group H2307 was composed of three solid (soil) samples designated under SAF No. F03-006 with a Project Designation of: 200-PW-2/200-PW-4 OU – Borehole Soil Sampling.

The samples were received as stated on the Chain-of-Custody documents. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist.

2.0 ANALYSIS NOTES

2.1 Tritium Analyses

No problems were encountered during the course of the analyses.

2.2 Carbon-14 Analyses

No problems were encountered during the course of the analyses.

2.3 Nickel-63 Analyses

No problems were encountered during the course of the analyses.

2.4 Total Strontium Analyses

No problems were encountered during the course of the analyses.

2.5 Technetium-99 Analyses

No problems were encountered during the course of the analyses.

2.6 Iodine-129 Analyses

No problems were encountered during the course of the analyses.

2.7 Isotopic Thorium Analyses

No problems were encountered during the course of the analyses.

2.8 Neptunium-237 Analyses

No problems were encountered during the course of the analyses.

2.9 Isotopic Uranium Analyses

No problems were encountered during the course of the analyses.

2.10 Total Uranium Analyses

No problems were encountered during the course of the analyses.

Case Narrative

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2.11 Isotopic Plutonium Analyses

No problems were encountered during the course of the analyses.

2.11 Americium-241 Analyses

No problems were encountered during the course of the analyses.

2.12 Gamma Spectroscopy Analyses

No problems were encountered during the course of the analyses.

Case Narrative Certification Statement

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data obtained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Melissa C. Mannion
Melissa C. Mannion
Program Manager

9/19/3
Date

FH-Central Plateau Project		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-006-201		Page 1 of 1	
Collector	Company Contact	Telephone No.	Project Coordinator	Price Code	Data Turnaround				
Pope/Fisher/Hughes/Johansen <td>LC Hulstrom<td>373-3928<td>TRENT, SJ<td>8N<td>45 Days<th colspan="4"></th></td></td></td></td></td>	LC Hulstrom <td>373-3928<td>TRENT, SJ<td>8N<td>45 Days<th colspan="4"></th></td></td></td></td>	373-3928 <td>TRENT, SJ<td>8N<td>45 Days<th colspan="4"></th></td></td></td>	TRENT, SJ <td>8N<td>45 Days<th colspan="4"></th></td></td>	8N <td>45 Days<th colspan="4"></th></td>	45 Days <th colspan="4"></th>				
Project Designation	Sampling Location	Field Logbook No.	SAF No.	Air Quality					
200-PW-27200-PW-4 OU - Borehole Soil Sampling <td>216-A-36B (C-4100) (7562)<td>HNF-N-3361<td>F03-006<td><input type="checkbox"/><th></th><th colspan="4"></th></td></td></td></td>	216-A-36B (C-4100) (7562) <td>HNF-N-3361<td>F03-006<td><input type="checkbox"/><th></th><th colspan="4"></th></td></td></td>	HNF-N-3361 <td>F03-006<td><input type="checkbox"/><th></th><th colspan="4"></th></td></td>	F03-006 <td><input type="checkbox"/><th></th><th colspan="4"></th></td>	<input type="checkbox"/> <th></th> <th colspan="4"></th>					
Ice Chest No.	Field Logbook No.	Offsite Property No.	Method of Shipment	Bill of Lading/Air Bill No.					
ERC 01-062 <td>HNF-N-3361<td>A0308324<td>Federal Express<td>SEE OSC<th colspan="4"></th></td></td></td></td>	HNF-N-3361 <td>A0308324<td>Federal Express<td>SEE OSC<th colspan="4"></th></td></td></td>	A0308324 <td>Federal Express<td>SEE OSC<th colspan="4"></th></td></td>	Federal Express <td>SEE OSC<th colspan="4"></th></td>	SEE OSC <th colspan="4"></th>					
Shipped To		COA							
EERKLINE SERVICES (Formerly TMA) <td colspan="2">117504ESI0<td colspan="2"></td><td colspan="2"></td><td colspan="2"></td></td>		117504ESI0 <td colspan="2"></td> <td colspan="2"></td> <td colspan="2"></td>							
POSSIBLE SAMPLE HAZARDS/REMARKS		Preservation		None					
RADIOACTIVE TIE TO: B173V3, B173Y4, B17495		Coolant		None <td colspan="2"></td> <td colspan="2"></td>					
Special Handling and/or Storage		Type of Container		aG					
None		No. of Container(s)		1					
		Volume		60mL					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (1) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (2) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (3) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (4) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (5) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (6) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (7) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (8) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (9) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (10) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (11) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (12) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (13) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (14) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (15) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (16) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (17) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (18) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (19) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (20) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (21) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (22) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (23) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (24) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (25) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (26) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (27) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (28) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (29) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (30) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (31) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (32) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (33) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (34) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (35) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (36) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (37) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (38) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (39) in Special Instructions.					
		NO2403-333; Oil & Grease - 413.1; Chromium - 7196		See Item (40) in Special Instructions.					

Plateau Project		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-006-202		Page 1 of 1			
Hughes/Johansen		Company Contact LC Hulstrom		Telephone No. 373-3928 H2507		Project Coordinator TRENT, SJ		Price Code 8N			
Signature W-2/200-PW-4 OU - Borehole Soil Sampling		Sampling Location 7-10-03 146 216-A-36B (C3248) - 89.5-92' (24160) (7562)		SAF No. F03-006		Air Quality <input type="checkbox"/>		45 Days			
Ic. Chest No. ERC 01-063		Field Logbook No. HNF-N-3361		COA 117504ES10		Method of Shipment Federal Express					
Shipped To EBERLINE SERVICES (Formerly TMA)		Offsite Property No. A030 324		Bill of Lading/Air Bill No. SEE CDPC							
POSSIBLE SAMPLE HAZARDS/REMARKS TIL TO: B17496 Special Handling and/or Storage None				Preservation		Cool 4C	None	None	None		
				Type of Container		aG	aG	aG	aG		
				No. of Container(s)		1	1	1	1		
				Volume		60ml	60mL	60mL	60mL		
SAMPLE ANALYSIS				NO2/O3 - 353.2; OH & Grease - 413.1; Chromium Hex - 71963 H2-4-03		See item (1) in Special Instructions.		See item (2) in Special Instructions.		Tritium - H3	
Sample No.		Matrix *		Sample Date		Sample Time					
B173W2		SOIL		8-4-03		1125					
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS The lab is to achieve a detection limit of 50.0 pCi/g for C-14. FH acknowledges that holding times (less than 14 days) may not be met by the lab due to the radf characteristics. (1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Cesium-134, Radium-226, Radium-228, Tin-126); Total Uranium; Americium-241; Isotopic Plutonium; Isotopic Uranium (2) Technetium-99; Strontium-89,90 - Total Sr; Isotopic Thorium (Thorium-232); Carbon-14; Iodine-129; Nickel-63; Neptunium-237			
Relinquished By/Removed From JSPoA/Agla		Date/Time 8-4-03/1570		Received By/Stored In Fridge # 2 mo-026		Date/Time 8-4-03/1570					
Relinquished By/Removed From Fridge # 2 mo-026		Date/Time 8-7-03 0800		Received By/Stored In Max Hansen		Date/Time 8-7-03					
Relinquished By/Removed From Max Hansen		Date/Time 8-7-03 0900		Received By/Stored In Fridge		Date/Time 8-7-03 0900					
Relinquished By/Removed From Max Hansen		Date/Time 8-7-03 1000		Received By/Stored In Max Hansen		Date/Time 8-7-03 1000					
Relinquished By/Removed From Max Hansen		Date/Time 8-7-03 1000		Received By/Stored In Max Hansen		Date/Time 8-7-03 1000					
Relinquished By/Removed From Max Hansen		Date/Time 8-7-03 1000		Received By/Stored In Max Hansen		Date/Time 8-7-03 1000		Matrix * S=Soil SB=Sediment SO=Solid SL=Sludge W=Water O=Oil A=Air DS=Drum Solids DL=Drum Liquids T=Tissue WI=Wipe L=Liquid V=Vegetation X=Other			
Relinquished By/Removed From Max Hansen		Date/Time 8-7-03 1000		Received By/Stored In Max Hansen		Date/Time 8-7-03 1000					
LABORATORY SECTION		Received By		Title		Date/Time					
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time					

Appendix 5

Data Validation Supporting Documentation

APPENDIX A

RADIOCHEMICAL DATA VALIDATION CHECKLIST

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	<u>C</u>	D	E
PROJECT: 216-A-36B Borehole-PW2			DATA PACKAGE: H2307		
VALIDATOR: K. Branner		LAB: E DeLine		DATE:	
CASE:			SDG: H2307		
ANALYSES PERFORMED					
Gross Alpha/Beta	Isotopes	Techniques	Alpha Spectrometry	Gamma Spectrometry	
Total Uranium	Radium-22	Thorium	C-14	Ni-63	I-129
SAMPLES/MATRIX B173W0, B173W1, B173W2					
Soil					

1. Completeness ☐ N/ATechnical verification forms present? Yes No ☒ N/A

Comments:

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2. Initial Calibration (Levels D, E) ☒ N/A

Instruments/detectors calibrated? Yes No N/A

Initial calibration acceptable? Yes No N/A

Standards NIST traceable? Yes No N/A

Appendix A – Radiochemical Data Validation Checklist

BHI-01433

Rev. 0

Standards Expired? Yes No N/A

Calculation check acceptable? Yes No N/A

Comments:

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3. Continuing Calibration (Levels D, E) ☒ N/A

Calibration checked within required frequency? Yes No N/A

Calibration check acceptable? Yes No N/A

Calibration check standards traceable? Yes No N/A

Calibration check standards expired? Yes No N/A

Calculation check acceptable? Yes No N/A

Comments:

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4. Background Counts (Levels D, E) ☒ N/A

Background Counts checked within required frequency? Yes No N/A

Background Counts acceptable? Yes No N/A

Calculation check acceptable? Yes No N/A

Comments:

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Appendix A – Radiochemical Data Validation Checklist

BHI-01433

Rev. 0

5. Blanks (Levels B, C, D, E) ☐ N/A

Method blank analyzed within required frequency? ☒ Yes ☐ No ☐ N/A

Method blank results acceptable? ☒ Yes ☐ No ☐ N/A

Analytes detected in method blank? Eu-154 ☒ Yes ☐ No ☐ N/A

Field blank(s) analyzed? Yes ☒ No ☐ N/A

Field blank results acceptable? Yes ☒ No ☐ N/A

Analytes detected in field blank(s)? Yes ☐ No ☒ N/A

Transcription/Calculation Errors? (Levels D, E) Yes ☐ No ☒ N/A

Comments: Eu-154 blanks results reported as "0", the MDA of 0.11 pCi/g exceeded the RDL of 0.10 pCi/g. Flag all Eu-154 results "5".

6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E) ☐ N/A

LCS /BSS analyzed within required frequency? ☒ Yes ☐ No ☐ N/A

LCS/BSS recoveries acceptable? ☒ Yes ☐ No ☐ N/A

LCS/BSS traceable? (Levels D,E) Yes ☐ No ☒ N/A

LCS/BSS expired? (Levels D,E) Yes ☐ No ☒ N/A

LCS/BSS levels correct? (Levels D,E) Yes ☐ No ☒ N/A

Transcription/Calculation Errors? (Levels D, E) Yes ☐ No ☒ N/A

Comments: No qualifiers

7. Chemical Carrier Recovery (Levels C, D, E) ☐ N/A

Chemical carrier added? ☒ Yes ☐ No ☐ N/A

Chemical recovery acceptable? ☒ Yes ☐ No ☐ N/A

Chemical carrier traceable? (Levels D, E) Yes ☐ No ☒ N/A

Data Validation Procedure for Radiochemical Analysis

October 2000

A-3

Appendix A – Radiochemical Data Validation Checklist

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Rev. 0

Chemical carrier expired? (Levels D, E) Yes No (N/A)

Transcription/Calculation errors? (Levels D, E) Yes No (N/A)

Comments: _____

8. Tracer Recovery (Levels C, D, E) ☐ N/A

Tracer added? (Yes) No N/A

Tracer recovery acceptable? (Yes) No N/A

Tracer traceable? (Levels D, E) Yes No (N/A)

Tracer expired? (Levels D, E) Yes No (N/A)

Transcription/Calculation errors? (Levels D, E) Yes No (N/A)

Comments: _____

No tracer/carrier used for C-14, yield assumed
to be 100%
5 C-14 results

9. Matrix Spikes (Levels C, D, E) ☐ N/A

Matrix spike analyzed? (Yes) No N/A

Spike recoveries acceptable? (Yes) No N/A

Spike source traceable? (Levels D, E) Yes No (N/A)

Spike source expired? Levels D, E) Yes No (N/A)

Transcription/Calculation Errors? (Levels D, E) Yes No (N/A)

Comments: MS only performed for H-3 analysis

Appendix A – Radiochemical Data Validation Checklist

BH1-01433

Rev. 0

10. Duplicates (Levels C, D, E) ☐ N/A

Duplicates Analyzed at required frequency? ☒ Yes No N/A

RPD Values Acceptable? ☒ Yes No N/A

Transcription/Calculation Errors? (Levels D, E) Yes No ☒ N/A

Comments: No qualifiers

11. Field QC Samples (Levels C, D E) ☐ N/A

Field duplicate sample(s) analyzed? ☒ Yes No N/A

Field duplicate RPD values acceptable? Yes No N/A

Field split sample(s) analyzed? Yes No ☒ N/A

Field split RPD values acceptable? Yes No ☒ N/A

Performance audit sample(s) analyzed? Yes No ☒ N/A

Performance audit sample results acceptable? Yes No ☒ N/A

Comments: Samples B173W1 and B173W0 are duplicates
Field

The range for the Ra 226 and Ra 228 results were
greater than 2x the RDL's. No qualifiers.

12. Holding Times (All levels)

Are sample holding times acceptable? ☒ Yes No N/A

Comments:

Appendix A - Radiochemical Data Validation Checklist

13. Results and Detection Limits (All Levels) ☐ N/A

Results reported for all required sample analyses? ☒ Yes ☐ No ☐ N/A

Results supported in raw data? (Levels D, E) ☒ Yes ☐ No ☐ N/A

Results Acceptable? (Levels D, E) ☒ Yes ☐ No ☐ N/A

Transcription/Calculation errors? (Levels D, E) ☒ Yes ☐ No ☐ N/A

MDA's meet required detection limits? ☒ Yes ☐ No ☐ N/A

Transcription/calculation errors? (Levels D, E) ☒ Yes ☐ No ☐ N/A

Comments: *MDA's did not meet RDL's*
